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Research article

Pain reduces discrimination in helping

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Abstract

Because of their shared neurobiological underpinnings, factors increasing physical pain can also increase feelings of social disconnection ("social pain"). Feelings of connection with a social group are reflected in the term social identification, and social identity is commonly associated with intergroup discrimination. In two experiments, we examined the notion that physical pain would reduce social identification and subsequently inhibit intergroup discrimination in helping. By using a pain memory manipulation and a support measure of helping in Study 1 (N = 173), and an actual pain manipulation combined with a behavioural measure of helping in Study 2 (N = 72), results from both studies confirmed the predictions. As expected, physical pain eliminated ingroup favouritism in helping, and identification mediated this effect in the ingroup condition but not in the outgroup condition. We discuss these findings in light of the apparently paradoxical relationship between social support and pain. Copyright © 2014 John Wiley & Sons, Ltd.

The expression "to lick your wounds" refers to the tendency to avoid or ignore people after an unpleasant or painful experience. It suggests that there is an association between feelings of pain and social disconnection. Indeed, emerging evidence indicates that such a link can be found at the neurological level, suggesting that physical pain relies on the same neurobiological substrates as pain that is associated with feelings of being ignored or excluded (Eisenberger, 2012; Riva, Wirth, & Williams, 2011). Although feelings of social disconnection are typically associated with negative psychological consequences such as depressed mood and reduced self-esteem (Williams & Nida, 2011), we argue that there may be at least one, unexpected, positive consequence: People who feel disconnected from their social group should be less likely to discriminate between members of their group and members of other, rivalling groups. The two experiments presented in the current paper were designed to examine this notion.

A growing body of research has demonstrated that social pain—that is, the painful feelings associated with social disconnection—and physical pain overlap in their neurological and physiological outcomes (Eisenberger, 2012; Eisenberger, Inagaki, Mashal, & Irwin, 2010; MacDonald & Leary, 2005; Riva et al., 2011). These studies found that the dorsal anterior cingulate cortex (ACC), a brain region commonly involved in the experience of physical pain, is also associated with the experience of social pain (Eisenberger, Lieberman, & Williams, 2003). If physical pain and social pain share the same neurobiological underpinnings, then factors that reduce the experience of physical pain may also reduce feelings of social pain. Indeed, DeWall et al. (2010) found that acetaminophen, a common physical pain suppressant also known as paracetamol, suppressed the pain associated with social disconnection.

Most of the research on the social and physical pain overlap investigated how social pain triggers similar neurobiological outcomes as physical pain. Two recent studies, however, focused on the reversed relationship, demonstrating that physical pain can increase feelings of social disconnection. Riva et al. (2011) exposed some of their participants to a physically painful experience by submerging their non-dominant hand in cold water (5–6 °C). Compared with a non-painful control condition, participants who experienced physical pain reported stronger feelings of being ignored and excluded. In another study, Eisenberger et al. (2010) gave participants either endotoxin (an inflammatory challenge) or a placebo. Inflammatory activity is often associated with the experience of physical pain. Accordingly, endotoxin led to a significant decrease in feelings of social connection and an increase in negative mood compared with the placebo condition.

The two studies described in the previous paragraph are important because they demonstrate that the experience of physical pain can induce feelings of social disconnection. However, the studies did not look into the potential behavioural outcomes of these feelings, as was the goal of the current research. Individuals' feelings of connection to

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the social groups they belong to are captured by the term "social identification" (Hogg, 2000; Postmes, Haslam, & Jans, 2012). Despite the fact that group membership provides many benefits to people, including increased self-esteem and reduced subjective uncertainty (Hogg, 2000), social psychologists have spent much of their efforts trying to account for ethnocentric biases and pervasive discrimination that appear to be intricately linked to social identity (Brewer, Manzi, & Shaw, 1993; Perreault & Bourhis, 1999).

Although the phenomenon is by no means universal (as van Leeuwen & Täuber, 2010, argued, there are many strategic reasons why people would be motivated to help other groups), numerous studies attest to the existence of an ingroup favouring bias in helping (e.g., Dovidio et al., 1997; Levine, Prosser, Evans, & Reicher, 2005; Rosenfield, Greenberg, Folger, & Borys, 1982). For example, Dovidio et al. (1997) showed that research participants who found themselves in a salient intergroup situation were more likely to help fellow ingroup members than outgroup members by placing posters across a university campus to recruit participants for a survey. In contrast, participants who were induced to think of the members of a previously distinct outgroup as belonging to the same, more inclusive ingroup did not discriminate in their willingness to help (former) outgroup and ingroup members.

Discrimination typically takes the form of "ingroup love" rather than "outgroup hate" (Brewer, 1999; Halevy, Bornstein, & Sagiv, 2008; Mummendey & Otten, 1998). When possible, people prefer to favour their own group rather than disadvantage other groups. Brewer (1999) argued that this asymmetry results, in part, from evolutionary processes that made it essential for long-term survival to share information, aid, and resources with other ingroup members. In other words, people rely on mutual cooperation within their ingroup—a process that is facilitated by the development of depersonalized mutual ingroup trust. People are therefore naturally programmed to cooperate with, and generally have favourable attitudes towards, other members of their ingroup. Within this framework, discrimination is a matter of ingroup favouritism and the absence of similar favouritism towards the outgroup. It follows that factors affecting discrimination in helping would primarily affect the motivation to help the ingroup and not (or to a lesser extent) the motivation to help the outgroup.

If the experience of physical pain leads individuals to disconnect from their social environment, then they may also feel less connected to, or identified with, their social group. Feeling disconnected from one's social group implies that one is less likely to engage in actions that are rooted in that group membership—including the tendency to favour ingroup members in acts of helping (Dovidio et al., 1997; Perreault & Bourhis, 1999). Consequently, the experience of physical pain could reduce discrimination in helping, in particular the motivation to help the ingroup.

Overview of Hypotheses

We conducted two studies to investigate the relationship between the experience of physical pain and discrimination in helping. If physical pain reduces participants' feelings of social connection as captured by social identification, then they should also be less inclined to favour their own group over another group in acts of helping. We therefore hypothesized that physical pain (compared with no pain) would reduce ingroup favouritism in helping by reducing the motivation to help the ingroup (*Hypothesis 1*). We further predicted that physical pain would reduce social identification (*Hypothesis 2a*). Moreover, because outgroup helping is not a function of identity in the same way that ingroup helping is (the ingroup love vs outgroup hate distinction; Brewer, 1999), we expected that identification would mediate the indirect effect of pain on ingroup helping but not on outgroup helping (moderated mediation; *Hypothesis 2b*).

STUDY 1

The aim of this first study was to provide a preliminary test of the hypotheses. By using a procedure developed by Chen, Williams, Fitness, and Newton (2008), participants in this study were asked to remember and relive a physically painful experience from their past. Their responses were compared with a control condition in which participants were asked to remember and relive a typical Wednesday afternoon. Imagining pain has been shown to activate the same pain-related neurons in the ACC as the actual experience of physical pain (Decety & Grèzes, 2006). Moreover, Riva et al. (2011), using the same procedure as Chen et al. (2008), found that participants reliving their pain reported a higher level of pain sensations in the present than participants in a neutral control condition, attesting to the effectiveness of this manipulation.

All participants in this study were White Americans. Following the pain manipulation, half of the participants read a brief description about a Black American organization that was lobbying for additional government funding for a programme to help underachieving Black schools. Participants were subsequently asked to indicate to what extent they supported this programme. This measure of outgroup helping was compared with a condition in which participants read about, and could express their support for, a programme for helping underachieving White schools. Because a refusal to help could be seen as counter normative, the mention that the aid programme had received some criticism because of its exclusive focus on Black (White) schools provided participants with a legitimate reason to withhold their support. Shaffer and Graziano (1980) found that discrimination in helping was stronger in the presence of alternative reasons to refuse help.

Pain often depresses mood (Eisenberger et al., 2010; Riva et al., 2011). Because mood could affect helping (Carlson, Charlin, & Miller, 1988), it is possible that participants in the pain condition become less willing to help the ingroup because they experience depressed mood. We therefore included a measure of mood to examine this alternative process. The study further contained measures of social identification and social connection.

Method

Two-hundred and twenty-one White American participants (111 women; $M_{age} = 35.04$, $SD = 11.53$) were recruited via

Amazon Mechanical Turk and randomly distributed across the conditions of a 2 (Pain: no pain vs pain) × 2 (Group: ingroup vs outgroup) between-participants experimental design. Based on preliminary analyses, several participants were removed from the final sample. Seventeen participants did not adhere to the instructions and provided irrelevant or nonsense descriptions when asked to describe their painful moment or Wednesday afternoon. Twenty-nine participants completed the survey in an unrealistically short time (less than 2 minutes, while pretesting suggested that a normal completion time of the study should be around 10 minutes), making it highly unlikely that they had fully read and understood the texts and questions. Two participants took more than 30 minutes to complete the survey, suggesting they were distracted for a prolonged period during the study. The final sample contained 173 participants (91 women; $M_{age} = 36.68$, $SD = 11.13$).

Participants were asked to complete a 10-minute online survey on personal recollections in exchange for a small fee. By following the same procedure as Chen et al. (2008) and Riva et al. (2011), participants in the pain condition were asked to remember a time in their life when they experienced severe physical pain and to take as much time as they needed to describe the situation and their feelings at that time. Participants in the control condition were asked to remember and describe a typical Wednesday afternoon in their lives.

Participants were then asked to complete a questionnaire that contained the manipulation checks and dependent variables, as well as a number of filler items. Unless otherwise indicated, all answers were assessed on 7-point scales (*1 = not at all*, *7 = very much*), and scales were created by averaging the items. The effectiveness of the pain manipulation was checked by asking participants to indicate on a thermometer (*0 = no pain*, *10 = extreme pain*) how much pain they felt at that time of their life they were asked to relive. The same thermometer was used to ask people to indicate how much pain they felt right now, by thinking back to that moment. *Identification* with White Americans was measured with a four-item scale adopted from Doosje, Ellemers, and Spears (1995; for example, "I identify with White Americans" and "I see myself as a real White American"; $\alpha = .94$, $M = 5.48$, $SD = 1.39$). We also included a measure of *affective identification*, asking participants to indicate on a slider accompanied by a smiley face how they felt about White Americans (*1 = very unhappy face*, *5 = very happy face*; $M = 4.09$, $SD = 0.78$). The study further contained a scale of *social connection* that was adopted from Eisenberger et al. (2010; five items, "To what extent were you feeling the following feelings at that time?," e.g., "I felt like being around other people" and "I felt disconnected from others" [R]; $\alpha = .86$). Participants were also asked to indicate their current *mood* using a slider accompanied by a smiley face (*1 = very unhappy face*, *5 = very happy face*).

Next, participants read a brief description about a Black (*outgroup*) or White (*ingroup*) organization that was seeking additional government funding for underachieving Black/White schools. The initiative was said to deal with an important social problem but was also criticized because of its exclusive focus on Black/White schools. Participants were subsequently asked to indicate how much they supported this aid programme across five items (e.g., "To what extent do you agree with this initiative?" and "To what extent would you like to see this programme funded?"; $\alpha = .98$), which constitutes the dependent variable *helping*.

At the end of the study, participants were again asked to indicate, this time on a 7-point scale, how much pain they felt right now, when thinking back to the moment they had described at the beginning of the study. Participants were subsequently paid, thanked, and debriefed.

Results

Unless otherwise indicated, all data were analysed in univariate analyses of variance with Pain and Group as independent variables. All significant results are reported.

Manipulation Checks

Participants in the pain condition reported feeling more pain at the time of their described experience ($M = 8.54$, $SD = 1.70$) than participants in the control condition ($M = 1.65$, $SD = 2.63$), $F(1, 169) = 430.73$, $p < .001$, $\eta_p^2 = .72$. When asked to describe how much pain they felt right now, participants in the pain condition still reported feeling more pain in the present ($M = 2.62$, $SD = 2.55$) than participants in the control condition ($M = 1.18$, $SD = 2.26$), $F(1, 169) = 14.81$, $p < .001$, $\eta_p^2 = .08$. A similar difference was also obtained on the pain measure that was included at the end of the survey ($M_{pain} = 5.82$, $SD = 4.38$, vs $M_{control} = 2.67$, $SD = 3.10$), $F(1, 169) = 28.97$, $p < .001$, $\eta_p^2 = .15$. These results indicate that the pain manipulation was successful not just in triggering physically painful memories but also in enhancing current pain sensations and maintaining these sensations throughout the study.

Social Connection

Feelings of social connection were affected by a main effect of Pain only, $F(1, 169) = 56.11$, $p < .001$, $\eta_p^2 = .25$. Participants in the pain condition reported feeling less connected to others at the time of their described experience ($M = 2.93$, $SD = 1.49$) than participants in the control condition ($M = 4.64$, $SD = 1.52$).

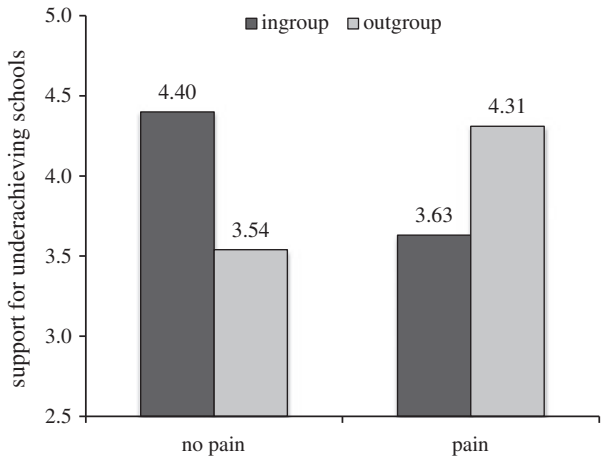

Figure 1. The effect of physical pain on support for underachieving ingroup or outgroup schools

Helping

A significant interaction effect was found for support for underachieving White or Black schools, $F(1, 169) = 6.95$, $p = .009$, $\eta_p^2 = .04$. The means are presented in Figure 1. Tests for the simple main effect of Group within each level of Pain revealed that, in the control condition, participants expressed significantly more support for the programme helping ingroup (White) schools than for the programme helping outgroup (Black) schools, $F(1, 169) = 4.08$, $p = .04$, $\eta_p^2 = .02$. In the pain condition, however, this pattern was eliminated, and a non-significant trend in the opposite direction was observed, $F(1, 169) = 2.89$, $p = .09$, $\eta_p^2 = .02$. Tested differently, the simple main effect of Pain in the ingroup condition was marginally significant, $F(1, 169) = 3.54$, $p = .06$, $\eta_p^2 = .02$, as was the simple main effect of Pain in the outgroup condition, $F(1, 169) = 3.41$, $p = .07$, $\eta_p^2 = .02$.

Identification

Only a small and non-significant trend was found as a result of the pain manipulation on the identification scale, $F(1, 169) = 0.77$, $p = .38$, $\eta_p^2 = .01$. Identification with White Americans was only somewhat lower in the pain condition ($M = 5.40$, $SD = 1.46$) compared with the control condition ($M = 5.57$, $SD = 1.32$). The affective identification measure, on the other hand, did reveal a significant main effect of Pain, $F(1, 169) = 5.79$, $p = .02$, $\eta_p^2 = .03$. As predicted in Hypothesis 2a, participants in the pain condition reported lower affective identification with White Americans ($M = 3.96$, $SD = 0.84$) than participants in the control condition ($M = 4.23$, $SD = 0.67$).

We subsequently used the affective identification measure to conduct a moderated mediation analysis using a bootstrap technique with 5000 intervals (as pre-defined in the PROCESS macro model 15, provided by Hayes, 2013). The model examined whether the indirect effect of Pain on helping was mediated by affective identification and whether this mediation was moderated by Group membership. Significant evidence for mediation was found in the ingroup condition, where zero was not included in the 95% confidence interval (boot indirect effect = 0.0933, $SE = 0.0532$, 95%CI: [0.0180, 0.2431]). No mediation was found in the outgroup condition (boot indirect effect = −0.0142, $SE = 0.0501$, 95%CI: [−0.1256, 0.0821]). Taken together, these results provide support for Hypothesis 2b in demonstrating that the induction of physical pain reduced ingroup helping, but not outgroup helping, and that this effect was mediated by the affective identification scale.

Mood

Mood was affected by Pain in the expected direction, $F(1, 169) = 9.94$, $p = .002$, $\eta_p^2 = .06$. Participants in the pain condition reported less positive mood ($M = 3.35$, $SD = 1.07$) than those in the control condition ($M = 3.84$, $SD = 0.95$). Moderated mediation analysis, however, showed that mood did not mediate the indirect effect of Pain on helping, either in the ingroup condition (boot indirect effect = −0.0457, $SE = 0.0601$, 95%CI: [−0.2013, 0.0540]) or in the outgroup condition (boot indirect effect = 0.0271, $SE = 0.0504$, 95%CI: [−0.0624, 0.1418]). The observed drop in mood as a result of the pain manipulation could therefore not account for the direct or indirect effect of Pain on helping.

Discussion

The goal of this study was to provide a first test of the hypotheses using a pain memory task. Consistent with prior research (Chen et al., 2008; Riva et al., 2011), instructing participants to remember and relive a physically painful experience from their past significantly increased their levels of self-reported pain in the present. These findings are in line with research on vicarious pain, which demonstrated that imagining pain activates the same pain-related neurons in the ACC as the actual experience of physical pain (Decety & Grèzes, 2006). The study also replicated research by Eisenberger et al. (2010) on the link between pain and feelings of social disconnection. Participants remembering a past painful experience reported significantly lower feelings of social connection at that time, compared with participants remembering a past Wednesday afternoon.

The results from this study provide some support for the predictions. In the neutral control condition, participants significantly favoured the support programme for ingroup schools over the programme helping outgroup schools, which is consistent with prior research demonstrating ingroup favouritism in helping (e.g., Dovidio et al., 1997; Levine et al., 2005; Rosenfield et al., 1982). This pattern disappeared in the pain condition. Moreover, although only marginally significant, the pain manipulation tended to reduce the tendency to help ingroup members specifically, as predicted in Hypothesis 1.

We also observed a non-significant trend in the pain condition reflecting outgroup favouritism. Although not expected, this trend is not inconsistent with our general line of reasoning. As Brewer (1999; see also Mummendey & Otten, 1998) argued, there is a fine line between non-cooperation and active competition. When resources are limited, and allocation of resources to one group automatically limits the amount of resources available for another group (i.e., when groups are negatively interdependent), ingroup favouritism and outgroup derogation are often intertwined. Participants could have construed the current programme to use government funding (a scarce resource) to help underachieving Black or White schools in the same interdependent way. As a consequence, a reduced motivation to help the ingroup in the pain condition could have translated itself into a slight increased motivation to help the outgroup.

Contrary to expectations, only affective identification was significantly affected by the pain manipulation and subsequently mediated the effect of Pain on helping in the ingroup condition but not in the outgroup condition. The identification scale was unaffected by the pain manipulation. Tajfel (1972) defined social identity as involving an individual's knowledge of group membership (cognitive identification) and the emotional significance the individual attaches to that membership (affective identification). Compared with the affective identification measure, the identification scale used in the current study more strongly taps into the cognitive element of identification. It is possible that participants' identity as White American was so important to them that feelings of social

disconnection as a result of a physically painful memory did not affect what is arguably a more central and stable element of identification: the cognitive awareness of group membership. Feelings of social connection may have more overlap with the affective component of social identification than with the cognitive component. Indeed, even though both identification measures were strongly correlated in the current study ($r = .71$, $p < .001$), suggesting that they assessed the same broader construct of identification, only affective identification with White Americans correlated with feelings of social connection at the time of the memory ($r = .19$, $p = .01$), whereas the identification scale was uncorrelated with social connection ($r = .03$, $p = .73$).

The inclusion of a measure of mood allowed us to rule out one important alternative explanation for our findings. Consistent with research on social pain (Williams & Nida, 2011), the memory of physical pain depressed participants' reported mood. Because mood is known to affect helping (Carlson et al., 1988), it is possible that participants in the pain condition became less willing to help an ingroup member because they experienced depressed mood. However, mediation analysis showed that mood did not mediate the effect of pain on helping, either in the ingroup condition or in the outgroup condition.

STUDY 2

The aim of the second study was to provide a more stringent test of our hypotheses, using a direct pain manipulation and a behavioural measure of helping. Dutch university students participated in a study ostensibly conducted by another student from their own university (ingroup) or by a student from a rivalling university in the same town (outgroup). Half of the participants were subjected to a mild pain sensation, whereas the other half did not experience physical discomfort. Discrimination was measured by unobtrusively assessing whether participants were willing to help the (ingroup or outgroup) experimenter by picking up pens from a box that was accidentally knocked over by the experimenter.

In addition to measures of helping, identification, and mood, the study also contained a measure of experimenter evaluation. This scale was included to examine the possibility that participants attribute their physical discomfort to the experimenter, which could result in reduced attraction to this person. Feelings of interpersonal attraction can affect the willingness to help others, particularly outgroup members. For example, Dovidio et al. (1997) showed that the willingness to help outgroup members was predicted by participants' interpersonal attraction to (or liking of) the recipient of help, whereas attraction did not predict the willingness to help ingroup members. Similar findings were also obtained by Siem and Stürmer (2012) and Stürmer, Snyder, and Omoto (2005). The pain manipulation could therefore inadvertently suppress the willingness to help because it reduces attraction to the experimenter.

Method

Seventy-two university students (55 women, $M_{age} = 21.65$, $SD = 4.29$) participated in this study in exchange for course credits or a candy bar. Participants were randomly assigned to the conditions of a 2 (Pain: no pain vs pain) × 2 (Group: ingroup vs outgroup) between-participants experimental design.

Participants were recruited in various central locations across their university campus by a male experimenter and through an electronic sign-up sheet. The study was described as a combination of an interview and two brief surveys on various topics. Each participant was received in a separate room that contained a table with a box of pens and some forms, two chairs, and a one-way mirror. The experimenter then introduced himself as either a student from the same university (*ingroup*) or a student from a rivalling university in the same town (*outgroup*). To lend credibility to the outgroup student conducting a study at a different university, he briefly indicated that he was conducting his research at the current location because of reconstruction works at his own university. Group membership was reinforced through the clear visibility of his university logo on several papers casually placed on the table. Before leaving the room, the experimenter asked the participant to open one of two envelopes (participants' choice) on the table after he left and to follow the instructions inside. Each envelope contained a wooden peg and instructions to place the peg at the top of the outer ear. The instructions included a picture to ensure participants understood where to place the peg. Unbeknownst to participants, the pegs were modified such that one envelope contained a peg that was very loose and would inflict little to no physical discomfort (*no pain condition*), whereas the other envelope contained a peg that was tightened and would produce moderate discomfort when worn for several minutes (*pain condition*).[1] Because of his temporary absence, the experimenter was unaware of the type of peg participants wore until at the very end of the experiment when they were instructed to remove the peg.

After a few minutes, the experimenter returned to the room. He then interviewed participants for approx. 7 minutes on their daily activities while they were wearing the peg. The main purpose of the interview was to extend the duration of the pain manipulation. Following the interview, participants were asked to fill out two separate paper questionnaires while the experimenter once again left the room. The experimenter repaired to the adjoining room where he could unobtrusively monitor participants' progress through the one-way screen. The first questionnaire ostensibly assessed the experimenter's interviewing technique as part of an evaluation of his research skills. Participants were asked to rate the experimenter on 14 traits (e.g., "professional," "friendly," or "uncomfortable" [R]; *1 = not at all applicable*, *5 = very much applicable*), which were later averaged into a single scale (*experimenter evaluation*; $\alpha = .85$). Participants were asked to deposit the completed questionnaire in a locked box. The second questionnaire included a check of the pain manipulation ("Please indicate on this scale to what extent you are currently experiencing physical discomfort as a result of the peg on your ear"

[1]The pain manipulation was created specifically for this study, in order to meet two requirements: (i) Participants should be able to inflict pain onto themselves in order to minimize pain attributions to the experimenter and to keep the experimenter blind to experimental condition. (ii) The same procedure needed to be used in the no pain condition to increase comparability of the two conditions.

1 = absolutely no discomfort, *9 = a lot of discomfort*) and a measure of *identification* adopted from Postmes et al. (2012; "To what extent do you identify with [university name]?"; *1 = not at all*, *7 = very much*; $M = 2.96$, $SD = 0.91$).[2] The questionnaire further contained a measure of *positive mood* ("To what extent do you currently feel the following emotions?," six items, e.g., "happy," "positive," or "cheerful"; *1 = not at all*, *7 = very much*; $\alpha = .73$) and a measure of *negative mood* (nine items, e.g., "angry," "sad," or "fearful"; $\alpha = .86$). The end of the questionnaire contained a written instruction to remove the peg from the ear.

Upon witnessing the removal of the peg, the experimenter immediately returned to the room to award participants with their study credits or candy bar, and to thank and debrief them. In order to do so, he seated himself at the table at a 90º angle from the participant. When reaching for some forms, he "accidently" knocked over the box of 15 pens placed on the table, scattering the pens over the floor. He then waited 2 seconds before starting to pick up the pens, one pen per second. The dependent variable *helping* constituted the number of pens that the participant volunteered to pick up for the experimenter (overall $M = 9.03$, $SD = 4.16$).

Results

Unless otherwise indicated, all variables were analysed in separate analyses of variance with Pain and Group membership as independent variables. All significant results are reported.

Manipulation Check

Participants in the pain condition reported more discomfort ($M = 4.32$, $SD = 1.75$) than participants in the no pain condition ($M = 2.97$, $SD = 1.74$), $F(1, 68) = 10.62$, $p = .002$, $\eta_p^2 = .135$, indicating that the pain manipulation was successful.

Helping

The number of pens participants picked up to help the experimenter was affected by a main effect of Group, $F(1, 68) = 6.31$, $p = .014$, $\eta_p^2 = .085$, which was qualified by the predicted interaction, $F(1, 68) = 5.56$, $p = .021$, $\eta_p^2 = .076$. The means are presented in Figure 2. Tests for the simple main effect of Group within each pain condition revealed that participants in the no pain condition were significantly more willing to help the ingroup experimenter than the outgroup experimenter, $F(1, 68) = 11.54$, $p = .001$, $\eta_p^2 = .145$, but this difference disappeared in the pain condition, $F(1, 68) = 0.12$, $p = .912$, $\eta_p^2 = .000$. Tested differently, tests for the simple main effect of Pain within each level of Group showed that the pain manipulation significantly affected participants' helping of the ingroup experimenter, $F(1, 68) = 4.91$, $p = .030$, $\eta_p^2 = .067$, but did not affect their helping of the outgroup experimenter, $F(1, 68) = 1.25$, $p = .267$, $\eta_p^2 = .018$. These results confirm Hypothesis 1.

[2]Although social identification is more commonly assessed with multiple-item measures, Postmes et al. (2012) and Reysen, Katzarska-Miller, Nesbit, and Pierce (2013) showed, across a total of seven studies, that the single-item identification measure used in the current study had good convergent, predictive, divergent, and test–retest validity.

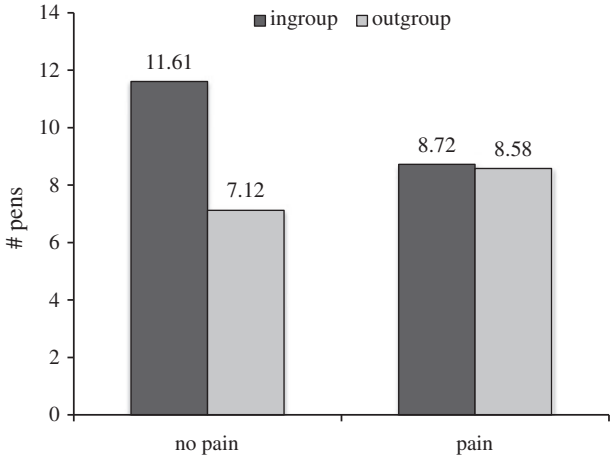

Figure 2. The effect of physical pain on helping an ingroup or an outgroup experimenter

Identification

Analysis of university identification revealed a main effect of Pain only, $F(1, 68) = 4.96$, $p = .029$, $\eta_p^2 = .068$. As predicted in Hypothesis 2a, participants in the pain condition identified less with their university ($M = 2.73$, $SD = 0.90$) than participants in the no pain condition ($M = 3.20$, $SD = 0.87$). We subsequently conducted a moderated mediation analysis using a bootstrap technique with 5000 intervals (as pre-defined in the PROCESS macro model 15, provided by Hayes, 2013). Significant evidence for mediation was found in the ingroup condition (boot indirect effect = 0.2438, $SE = 0.1625$, 95%CI: [0.0186, 0.6965]). No mediation was found in the outgroup condition (boot indirect effect = 0.1705, $SE = 0.2604$, 95%CI: [−0.1277, 1.0062]). These results confirm Hypothesis 2b in demonstrating that the induction of physical pain reduced ingroup helping, but not outgroup helping, and that this effect was mediated by identification.

Experimenter Evaluation

Participants in the pain condition evaluated the experimenter more negatively ($M = 3.96$, $SD = 0.36$) than participants in the no pain condition ($M = 4.21$, $SD = 0.35$), $F(1, 68) = 8.49$, $p = .005$, $\eta_p^2 = .111$, regardless of his group membership. We conducted a moderated mediation analysis (model 15) to examine whether experimenter evaluation mediated the indirect effect of pain on helping and whether this effect differed for participants who could help an ingroup experimenter and those who could help an outgroup experimenter. No mediation was found in the ingroup condition (boot indirect effect = 0.2555, $SE = 0.2686$, 95%CI: [−0.1825, 0.9113]). However, significant evidence for mediation was obtained in the outgroup condition (boot indirect effect = −0.6655, $SE = 0.2907$, 95% CI: [−0.4062, −0.2161]). These results show that the indirect effect of the pain manipulation on helping was mediated by participants' evaluation of the experimenter, but only in the outgroup condition. The significant drop in helping in the ingroup condition as a result of the pain manipulation could therefore not be attributed to more negative evaluations of the experimenter.

Mood

Negative mood was unaffected by the manipulations (all p's $> .15$). Positive mood was affected by a main effect of Pain, $F(1, 68) = 5.76$, $p = .019$, $\eta_p^2 = .078$. Participants in the pain condition reported lower positive mood ($M = 3.17$, $SD = 0.60$) than participants in the no pain condition ($M = 3.47$, $SD = 0.43$). Moderated mediation analysis, however, showed that positive mood did not mediate the indirect effect of Pain on helping, either in the ingroup condition (boot indirect effect = −0.1049, $SE = 0.2292$, 95%CI: [−0.7099, 0.2675]) or in the outgroup condition (boot indirect effect = −0.0840, $SE = 0.1863$, 95%CI: [−0.5499, 0.2299]). The observed drop in positive mood as a result of the pain manipulation could therefore not account for the direct or indirect effect of Pain on the willingness to help an ingroup or an outgroup experimenter.

Discussion

The results from this experiment replicate those from the first study in demonstrating that participants who did not experience physical discomfort were more inclined to help an ingroup member than an outgroup member. However, as expected, participants who were subjected to a mild pain sensation did not favour an ingroup member over an outgroup member in their willingness to help. Specifically, participants in the pain condition, compared with those in the no pain condition, were less willing to help a fellow ingroup member but equally willing to help an outgroup member. These findings are consistent with the notion that discrimination more often takes the form of favouring ingroup members than disadvantaging outgroup members (Brewer, 1999). The induction of physical pain also reduced participants' identification with their university. Confirming our prediction, identification mediated the (in)direct effect of pain on helping in the ingroup condition but not in the outgroup condition.

The inclusion of additional measures of mood and experimenter evaluation also allowed us to rule out two alternative explanations for our findings. As in Study 1, the induction of physical pain lowered participants' reported positive mood. However, mood did not mediate the effect of pain on helping, either in the ingroup condition or in the outgroup condition. The drop in mood as a result of the pain manipulation could therefore not account for variations in helping. The pain manipulation also affected participants' evaluation of the experimenter. Feelings of interpersonal attraction can affect the willingness to help others, particularly outgroup members. Moderated mediation analysis revealed that experimenter evaluation indeed mediated the indirect effect of pain on helping in the outgroup condition, which is in line with earlier findings (e.g., Dovidio et al., 1997; Siem & Stürmer, 2012; Stürmer et al., 2005). However, experimenter evaluation did not mediate the indirect effect of pain on ingroup helping and can therefore not account for the reduced willingness to help ingroup members in the pain condition compared with the no pain condition.

Following instructions, participants in the current study removed the pegs from their ears before the experimenter returned directly afterwards and the willingness to help the experimenter was assessed. We therefore need to consider the possibility that participants in the pain condition experienced greater relief upon removal of the peg than participants in the no pain condition and that these feelings of relief could have reduced the tendency to discriminate between the ingroup and the outgroup experimenter. Because the study did not include additional measures of mood or other variables after removal of the peg, we are unable to rule out this alternative explanation.

GENERAL DISCUSSION

Despite the use of different pain manipulations and helping measures, and despite tapping into different group identities, the results from the two studies reported in this paper paint a consistent picture. Without pain, participants in both studies significantly favoured (a member of) their ingroup over the outgroup in helping. These findings align with existing research demonstrating a pattern of ingroup favouritism in helping (e.g., Dovidio et al., 1997; Levine et al., 2005; Rosenfield et al., 1982). The induction of a mild pain sensation, however, eliminated ingroup favouritism in both studies. Prior research showed that, because social pain and physical pain overlap in their neurological and physiological outcomes (Eisenberger, 2012; MacDonald & Leary, 2005), physical pain can trigger feelings of social disconnection (Eisenberger et al., 2010; Riva et al., 2011; see also Study 1 in the current paper). However, the current studies were the first to demonstrate that these feelings of general social disconnection are also reflected in measures of social identification and that, as a consequence, the tendency to favour the ingroup diminished.

Animal models of pain behaviour posit that initial withdrawal from other animals is a necessary defence mechanism in order to focus one's resources on recovering (Hart, 1988; Wall, 1989). Indeed, pain researchers consistently observe that people respond to pain by limiting their movements, sleeping for prolonged periods, and restricting social contact (Bonica, 1985; Wall, 1989). At first glance, however, this withdrawal from the social environment as a result of physical pain seems at odds with Schachter's fear-affiliation theory (1959) as well as with the well-demonstrated positive effects of social support on pain experience. Schachter (1959) observed that participants in a high-anxiety state (induced by anticipating painful shocks) showed greater tendencies to affiliate with others than participants in a low-anxiety state. The underlying rationale is that companionship during stress enables the individual to reduce anxiety levels by providing mutual comfort and support. Social comparison theory (Festinger, 1954) argued that affiliation in stressful situations serves to compare and judge the appropriateness of one's reaction to the stressful setting. This desire for affiliation therefore is not general but specific to affiliation with others in a similar state. In Schachter's words, "misery does not love just any kind of company, it loves only miserable company" (1959, p. 24).

When applied to the current context, Schachter's (1959) work would suggest that pain, insofar as it heightens anxiety, would increase participants' desire for affiliation with others undergoing similar experiences. However, social identification

in both studies did not pertain to affiliation with others in a similar painful or generally stressful situation (and neither did social connection in Eisenberger et al., 2010). Although it is possible (perhaps even plausible) that participants in the pain conditions had an increased desire to affiliate with others in a similar situation, the studies did not contain measures to examine this. Ingroup favouritism in helping likewise did not refer to discrimination between those with pain and those without pain. The ingroup in both studies was a broad category of people who, for the most part, did not share participants' painful experience. The current findings that pain reduced ingroup identification and discrimination are therefore not inconsistent with fear-affiliation theory.

The need for affiliation could also express a desire for general social support, which need not necessarily come from others in a similarly painful or stressful situation. Friends, family members, colleagues, and even total strangers can all provide support without sharing the same emotional state. Numerous findings attest to the positive impact of such social support on the experience of physical pain (e.g., Kulik & Mahler, 1989; Stefaniak et al., 2012). For example, Brown, Sheffield, Leary, and Robinson (2003) found that participants who were subjected to a cold pressor task (a mild pain induction) reported less pain sensation when receiving support from another person compared with participants who did not receive support. If support is so effective in coping with pain, then why did participants in the current research, as well as those in Eisenberger et al. (2010) and Riva et al. (2011) studies, show a decrease in feelings of social connection or identification following a pain induction, rather than an arguably more instrumental increase?

The seemingly paradoxical relationship between pain and social contact as described in the previous paragraph may be better understood when distinguishing between immediate and instinctive responses to pain, and factors that facilitate coping with persistent pain. Literature on social pain differentiates between reflexive and reflective stages of coping (Williams, 2007). Reflexive reactions describe immediate responses that occur without deliberative thinking. Reflective reactions, in contrast, describe goal-directed behaviours that occur once individuals have formed a more thorough appraisal of the situation. Social withdrawal appears to be a reflexive response to physical pain—one that occurs without much deliberation. As their pain continues, it seems more likely that people transition into the reflective stage. They may change their behaviour in order to cope more constructively with their pain, and this could include seeking social support. However, although demonstrably effective in reducing the intensity of pain, the pursuit of social support by people with prolonged or chronic pain is often severely hindered. For example, there are strong social stigmas associated with chronic pain (Nielsen, 2001), which can inhibit social contact. Pain also often limits movement, leading to work restrictions and loss of social roles (Silva, Sampaio, Mancini, Luz, & Alcântara, 2011). Consequently, we see that people in chronic pain often restrict their social contact to members of the immediate family or close friends (Silva et al., 2011). These family members and friends may constitute the most valuable basis of support.

The results presented in the current paper also appear somewhat at odds with the observation that pain frequently triggers aggressive responses (Berkowitz, 1993). This is true for both physical pain and social pain (Twenge, Baumeister, Tice, & Stucke, 2001; Williams, 2007). It follows that one would expect a main effect of pain on prosocial behaviour, such that participants in our studies who were subjected to the pain manipulation would, in general, have been less willing to help compared with participants in the control or no pain conditions. The relationship between pain and aggression, however, is not quite this straightforward. Aggression is part of a "fight" response to threat, the goal of which is to take control and eliminate the source of threat—be it physical or social. Warburton, Williams, and Cairns (2006) found that social pain only led to aggression when people were deprived of control. People who were given an opportunity to restore feelings of control following social pain did not show signs of increased aggression. This suggests that, if people in pain are given an opportunity to respond in a non-aggressive manner that allows them to restore feelings of control, aggressive inclinations would diminish. Indeed, Berkowitz (1993) contended that aggressive reactions to pain are more likely to occur when response tendencies stronger than the aggressive inclinations have not been evoked. In our studies, participants were given a clear opportunity to help others. Helping others is a well-known strategy to reassert control (Nadler, 2002). Rather than suppressing helping behaviour as a sign of aggression, participants could also have used the opportunity to help that was provided in our studies to reassert control.

Although research on the consequences of physical and social pain shows a remarkable similarity, there are nonetheless a number of inconsistencies that need to be addressed in future research. A full discussion of these is beyond the scope of this paper, but we would like to highlight one possible incongruence in the context of intergroup discrimination. Across two studies, Greitemeyer (2012) found that social exclusion increased participants' expressions of ethnocentrism, thereby reflecting an increased preference for the ingroup over outgroups. This observation appears at odds with the current findings that physical pain decreased discrimination in helping. Williams (2009) argued that behavioural responses to social pain are focused on fortifying the specific basic needs that have been threatened. One could speculate (but future research needs to examine this hypothesis) that social pain constitutes a greater threat to particularly the needs for belonging and self-esteem than physical pain. Social exclusion, more than physical pain, suggests that one is not liked and wanted by ingroup members. Threatened needs for belonging and self-esteem trigger responses to restore these needs. If physical pain is indeed less threatening to the specific needs of belonging and self-esteem than social pain, then it makes sense that participants in the current study did not show increased ingroup favouritism in the same way as participants in Greitemeyer's (2012) studies on the consequences of social pain did.

To summarize and conclude, the results from both studies presented in this paper supported our predictions in demonstrating that physical pain reduced discrimination in helping, specifically by reducing the tendency to favour the ingroup, and that this pattern was mediated by social identification. We have argued that these findings are not inconsistent with

fear-affiliation theory nor with the observation that social support is constructive in alleviating pain. Rather, it appears that social withdrawal is an immediate, reflexive response to pain. Future research should investigate this notion in more detail. As research on the benefits of social support has mainly focused on cases of chronic pain (but see Brown et al., 2003, for an exception), little is still known about support seeking behaviour in the initial stages of pain. Future research should also investigate the link between social identification and social connection in more detail. The results from the first study suggest that social connection is more closely related to the affective component of social identification than the cognitive component. Indeed, this would fit with the evolutionary purpose of social withdrawal following a painful experience. The tendency to "lick one's wounds" does not imply a reduced cognitive awareness of one's group membership or even the reduced importance of that group. Rather, it suggests that one is momentarily less able to derive pride and joy from that group membership because of other, more pressing matters.

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